

## ABSTRACT OF THE DISCLOSURE

[0033] A cryocooler having two operating modes so that its operating range is broadened, its gas bearing system is maintained in an operable state and it can utilize piston stroke modulation for energy efficiency. A piston stroke modulator modulates the piston stroke when the commanded piston stroke exceeds the minimum stroke and  
5 maintains the minimum stroke when the commanded stroke is less than the minimum stroke. A heater applies heater power to the thermal load when the commanded piston stroke is less than the minimum piston stroke. A closed loop feedback control system is used which has two branches of its dynamic leg. One branch controls the modulation of the cryocooler and the second, parallel branch controls the modulation of the heater.

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